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BHS 2012 in DUNDEE

...a very hydrological occasion





A rather damp field trip ending to a great meeting – you should have been there!

The 11th BHS National Symposium



held in Dundee this year, was a typical BHS 'do' — lots of good presentations, and a welcome chance to network in congenienal surroundings at the excellent West Park Centre.

A key feature of the event was of course our Penman lecture given this year by **Keith Beven** on "Here we have a system in which liquid water is moving; let's just get at the physics of it" (Penman 1965). A paper based on the Keith's ecture will be included in a Special Issue of *Hydrology Research* which will comprise extended and enhanced versions of about a dozen of the Symposium Proceedings papers. This SI is being Guest Edited by Andrew Black and should be published in online preview mode by August 2013.

The Dundee weather wasn't too kind to us but this did not daunt delegates from enjoying the reception on board *RRS Discovery* before the Symposium Dinner. Our After Dinner speaker was Prof **Paul Jowitt** of Heriot-Watt University who welcomed us all to Dundee, the City of Discovery and the Dandy, Dundee Cake and the Dundee Courier. The six great J's of Dundee, he said, are "Jam, Jute, Journalism .....Jinneering, Jenetics .....and the reason we're all here tonight: the Jeneralised Unit Hydrograph...."

Paul gave a great speech, too long to reproduce in full here, but we've taken the liberty of pulling out some of the plums, as follows:

"Hydrology is in the news. 2012 is not only the year of the 11th National Symposium, but 2012 seems like the year of hydrology. Hydrologists on the TV at every meteorological and hydrological turn - droughts, floods, leakage the only thing that's missing is pestilence.

The BHS has come a long way since Exeter in 1982 and the IAHS Exeter Symposium on the Optimal Allocation of Water Resources. Someone organised a side event to see whether there was a need for a UK-wide hydrological society. Of course, Scotland had one already, the Scottish Hydrology Group.

There were about 200 attendees at the Exeter Symposium, and there are at least 400 people who have claimed to have been at the meeting which conceived BHS. I think I was one of them....

You can gauge the success and impact of BHS in various ways. It has 1100 members drawn from across the spectrum of hydrology activity, from engineering hydrology to environmental hydrology, from hydrological processes to water resources. It is the Institution of Civil Engineers' second largest Associated Society.

Since its inception, BHS has organised 11 National Symposia, 3 International Conferences, and perhaps most vital of all, it now organises the Peter Wolf Early Career Hydrologist's Event and supports young hydrologists in other ways through scholarships and travel grants. This support is vital, not least in the wake of the vacuum created by the loss of NERC studentships for MSc programmes in Hydrology. It was no accident that these courses provided a generation of hydrological expertise working across the globe. BHS has more active young members than any learned society I know. Maybe it helps that hydrology is in many ways, still a young science."

But it isn't just about size, he went on, citing the 5th National Symposium held at Heriot Watt with Prof Jim Dooge as the Penman Lecturer who was also one of BHS's Honorary Fellows.

When he came to receive an Honorary Doctorate at Heriot-Watt, I asked him to give a seminar to the Water Resources MSc students. He started by showing some pictures of Babylonian clay tablets describing water management and then linked that to present day issues, including water security. He covered not only the science of water, but also the scales of scientific enquiry. Traditionally, water management problems operate at a scale where water can be treated as a continuum with no memory and where a few key scientific/engineering principles can be applied:

Mass Balance; Archimedes; Energy Balance; Newton's Laws…

The Key Equations: Continuity; Bernoulli; Force-Momentum Equation; Navier Stokes Equations…..

And traditionally, the key water engineering applications such as open channel flow; river management; power generation, water resources, supply and distribution; floods; droughts; sediment transport; water quality modelling and management.

But these were no longer enough: we were entering the realm of Hydro Environmental Engineering – at scale. There is a new agenda: increasingly, real problems have either impacts that need to account for (non-commensurate) socio-enviro-economic effects, or which account for large scale heterogeneity. This requires trans-disciplinary and/or large scale systems models .

In 40 minutes, Jim Dooge outlined the whole agenda.

When I last saw him before he died in 2010 he told me he was writing his memoirs at the request of the Royal Irish Academy. We will all have to wait now while someone helps finish the job to then learn of Jim's role in drafting the Dublin Principles on Water at the International Conference on Water and the Environment (ICWE) in January 1992.

The essence of the Dublin Principles were that:

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment;
- Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels;
- Women play a central role in the provision, management and safeguarding of water;
- Water has an economic value in all its competing uses, and should be recognised as an economic good.

Twenty years later, the issues of water security loom ever larger, and many of them come back to hydrological failure - including the long term but inexorable closing of the gap between water availability and demand - drought/ loss of headroom etc. And at the other hydrological extreme, there are issues of water excess. Both are wrapped up in the issues of climate change and the impact of human activity.

The problems we face are at both national and international scales. In the UK there are the water resources issues in the south east. Here in Scotland, we are attempting to develop the concept of the Hydro Nation, which addresses the water and energy nexus.

At the international scale, the issues are perhaps even more stark, for example, the water infrastructure gap between rich and poor, which in terms of reservoir storage capacity provides 6000 m3/per person in North America and 38 m3/per person in Ethiopia.

Hydrology is no longer an academic subject of purity,

but one which has to confront the issues of the time and help deal with the self-inflicted environmental and social crises caused by human behaviour.

This is why the role of BHS is so vital, why the outcomes from this and earlier BHS symposia and conferences are so important, and why its support for young hydrologists is so essential.

Now is the time to focus on working with the powers of nature for the use and benefit of society. Providing the platform for a sustainable future for succeeding generations has never had a more important moral, economic, social and environmental imperative. As hydrologists, as civil engineers, as hydraulic engineers, as dam engineers, this is our job.

Now is the time to deliver."

President's piece

I hope those of you who managed to get to the Symposium in Dundee enjoyed it and found it worthwhile. I thought the mix of presentations was excellent – no matter what your area of expertise you are likely to have found something new - and the atmosphere was very relaxed and friendly. It was a great credit to all those who helped in the organization (not me, I hasten to add!) and I am very grateful to everyone involved who managed to pull off an excellent meeting in a relatively short time.

If there was one thing that could have been better it was the mix of members who were present. One of the Society's main aims is to facilitate exchange between its academic and practitioner members, and there were few of the latter at Dundee. I guess this is a sign of the times – I know few practitioners can afford to spend time away from fee-earning activities – but it is a short-term view and without that interaction we will all end up the poorer.

One resolution I came away from Dundee with was to start organizing the 2014 Symposium earlier, and to make it more accessible so we can get a greater mix of membership attending. I welcome any views on venue or format – please email me at president@bhs.org.uk.

Finally – an apology for suggesting in my last Piece that the Government White Paper on water makes no mention of rainwater harvesting or water re-use. I am grateful to Dr Sarah Ward for pointing out that these sources of water supply are indeed recognized in the publication which states their use should indeed be considered in the future. Thank you Sarah – I stand corrected!



President

Travel grants

Travel grants are awarded from the Society's general funds to help BHS members whose travel expenses to attend scientific meetings are not met by an employer. Applicants should have been members of the Society for at least six months. The amount will depend on the nature and location of the meeting and the case put forward. Priority is given to members under 35 or retired from employment, who are presenting papers and who have not previously received support from BHS. Successful applicants will be expected to write a short report for *Circulation*. Travel grant applications should be made to the Hon Treasurer at least two months before the conference or meeting.

The Exeter Fund, administered by the Society, offers grants to British hydrologists to take part in IAHS / IUGG events.

To apply, use the form at *www. hydrology.org.uk/about_awards.htm* or contact **Nigel Goody**, SEPA, 7, Whitefriars Crescent, Perth PH2 0OPA *(tel 01738 448806, email: nigel.goody@sepa.org.uk)*.

An update on the International Hydrological Programme of UNESCO

The 20th Session of the Intergovernmental Council of the UNESCO International Hydrological Programme (IHP) was held in Paris from 4–7 June 2012. The Council meets every two years to consider the Programme's current progress and future plans. The session was well attended with over 80 Member States, including the majority of current Council Members. The UK is not currently a Council Member and attended the session as an Observer. The UK Delegation was headed by Alan Jenkins (CEH), as Chair of the UK Committee for National and International Hydrology (see *Circulation No. 109*), supported by Harry Dixon (CEH). Ian Ball (University of Dundee) attended representing the IHP-HELP Centre for Water Law, Policy and Science, a Category II Centre under the auspices of UNESCO, based at the University of Dundee.

Following the opening of the session by the outgoing Chairperson and an address by the UNESCO Assistant Director General for Natural Sciences, the Council elected a new Bureau to act as the governing body of the IHP until the next Intergovernmental Council meeting in 2014. The Bureau comprises six members, each representing one of UNESCO's electoral regions. Dr Johannes Cullmann, from the German National Secretariat for the IHP, was duly elected to serve as the next Chair of the IHP. In addition to procedural matters and routine reporting, the majority of the Council deliberations centred on the results of an independent evaluation of IHP-VI (2002–2007) and endorsement of the strategic Plan for the next phase of the Programme (IHP-VIII, 2014–2021). The Secretariat also presented highlights of IHP activities in the current phase (IHP-VII 2008–2013) — including scientific achievements of IHP initiatives such as the International Sediment Initiative (ISI), the development of an African Drought Monitor and progress in the area of water education.

A draft Strategic Plan for the Eighth Phase of the IHP (2014–2021) has been developed over the last two years (see *Circulation No. 106*) and was approved at the 2012 Session. IHP-VIII will be entitled 'Water security: Responses to local, regional, and global challenges' and comprise six Themes covering:

- Theme 1: Water-related disasters and hydrological change
- Theme 2: Groundwater in a changing environment
- Theme 3: Addressing water scarcity and quality
- Theme 4: Water and human settlements of the future
- Theme 5: Ecohydrology, engineering harmony for a sustainable world
- Theme 6: Water education, key for water security

The Secretariat for the UK National Committee for the IHP, operated by CEH, is keen to collect ideas of potential UK contributions to IHP-VIII so that a coordinated input from 'UK hydrology' may be put forward. Those interested in hearing more about the plans for IHP-VIII, or who feel their activities may contribute to the Programmes, are invited to contact Harry Dixon (see below).

Other business considered by the Council during the 20th Session included the endorsement of four new Water Related UNESCO Category II Centres and consideration was given to the possible development of a 'global campus' by the IHE Institute for Water Education (Delft). The Council also requested the initiation of a new initiative on Water Quality and encouraged Member States to contribute to the Global Groundwater Information System and cooperate further on the study of transboundary aquifers.

Further information about the IHP can be found on the UNESCO website at: http://www.unesco.org/new/en/natural-sciences/environment/water/ihp/.

Harry Dixon
UK National Committee for the IHP of UNESCO
Centre for Ecology & Hydrology
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Obituary

Dr Reg Herschy
1926-2012



Reg began his career at a Civil Engineering firm in Glasgow before being recruited as a Hydrologist by the Lothians River Purification Board – a rare designation in 1958. He moved south in 1964 to accept a post with the Surface Water Survey and when this was absorbed by the newly-created Water Resources Board (WRB) he was appointed Principal Hydrometric Engineer. This defining role was concerned with the design, appraisal and implementation of networks to monitor all components in the hydrological cycle. Reg became the prime mover in establishing the hydrometric monitoring capabilities that now underpin UK hydrology, water management and engineering design procedures.

Over the following decade Reg made major contributions to the WRB's ambitious work programme, which provided a firm foundation for water resources management over much of the ensuing half century, whilst also leading a range of pioneering hydrometric research projects. These embraced the development of weather radar, satellite telemetry and, most notably, the development of new flow measurement techniques. The latter initiative resulted in the commissioning of many purpose-built gauging weirs and the deployment of new ultrasonic and electromagnetic gauging stations. Following the disbanding of WRB this research continued at the Water Data Unit where Reg supervised a rapid expansion in the UK gauging station network through the 1970s. It is appropriate that, as a Scot, Reg assumed the mantle of Captain W N McClean who pioneered the establishment of river gauging networks early in the twentieth century. More than any other individual, Reg was responsible for transforming an inadequate and poorly-planned patchwork of gauging stations into the extensive network necessary to meet the complex demands of the 21st century.

Reg's firm belief in the value of high quality hydrometric data was a defining focus throughout his career and a stimulus for a wide-ranging series of technical reports and peer-reviewed publications. He was actively involved with the development of hydrometric standards for over 45 years having become a member of the BSI committee on hydrometry in 1966, which he subsequently chaired from 1980 to 2011. Reg also represented the UK on the ISO Committee on hydrometry and was appointed Chairman of the ISO Hydrometry sub-committee on Velocity Area Methods in 1973, a post he held with distinction for more than 30 years. He was the inaugural chairman of the European Standards (CEN) committee on Hydrometry, a position he held from 1994 - 2005. Reading University awarded him a PhD in 1975 for his research into errors and uncertainties in flow measurement. Drawing in particular on his pioneering work in flow measurement he authored two books: Hydrometry: Principles and Practices and Streamflow Measurement; which, together with subsequent editions, became the standard works both within the UK and across much of the world. In recognition of the breadth of Reg's research portfolio – extending eventually to over 60 professional papers on hydrology and hydrometry – he was awarded a DSc by Reading University in 1996.

Over the latter stages of his career Reg undertook a wide range of national and international consultancy work and, in his case, retirement was to prove a misnomer. He joined Dr David Newsome as a Partner in a scientific and engineering consultancy and completed a seminal study into the economic value of gauging station networks

– concluding that their ability to detect and quantify change was of the highest economic significance. In 2002, at a time when the international collation and publication of flood data was declining in both frequency and quality, Reg agreed to update the IAHS/UNESCO/WMO World Catalogue of Maximum Observed Floods. It required remarkable diligence and considerable powers of persuasion to collate and critically review the submitted material to facilitate publication. Earlier he was engaged as co-editor of the prestigious Encyclopedia of Hydrology and Water Resources and, thence, a companion volume, the Encyclopedia of Lakes and Reservoirs (published just prior to his death).

Reg's passion and energy for hydrometry showed few signs of diminishing and those who knew him thought he was indestructible. In 2010 while attending a field excursion during ISO meetings in the USA, Reg was observed scrambling up and down river banks more agilely than hydrologists half his age. Only a few months before he passed away he intimated that he was looking forward to assisting the ISO Working Group with revisions to the guidance document on hydrometric uncertainties.

Reg has bequeathed to the world an impressive engineering and scientific legacy. He also inspired several generations of hydrologists and hydrometric practitioners; many will recall with gratitude Reg's wise counselling and expert guidance. To his many friends and colleagues he was an engaging and stimulating companion with a dry wit and an eclectic range of interests. Reg will be remembered with admiration and great affection by all who were fortunate enough to work with him. He will be very sadly missed.

Terry Marsh and Stewart Child

News miscellany

CONGRATULATIONS to **Keith Beven** on his award of the 2012 AGU Horton Medal. This medal/award/prize is awarded for outstanding contributions to hydrology and will be awarded at an Honors Ceremony on December 5 at the 2012 AGU Fall Meeting in San Francisco.

Adam Comerford, from British Waterways, has now taken over from Colin Fenn as the CIWEM Water Resources Panel representative on the BHS National Committee.

MSc students/supervisers looking for a research topic may be interested that the papers of the late **Sir Charles Pereira, FRS**, are available for bona vide students to access for research purposes. H. C. Pereira was a great authority on land use and water management, through his personal research in East Africa, as Chief Scientist to the Minsitry of Agriculture and his various international asssignments for the UN and World Bank. His scientific career is fascinating, as is his tussles with Whitehall over the implementation of the Rothschild principles of research funding brought in with the Thatcher administrations. Interested parties should contact Dr Jim Mcculloch in the first instance, on 01865 407770 or rmccull585@aol.com

Sadly, we have just learned that **Prof. John Monteith** has passed away. His achievements in environmental physics and micrometeorology over more than fifty years were vastly influential in establishing the foundations of many of the measurement and analysis techniques that are employed today.

New Members

Furat Ahmed Mahmood Al – Faraj.....Bolton
Nataliya Bulygina.....Imperial College London
David Anthony Gibson.....Hyder Consulting (UK) Ltd, Exeter
Nicholas Kettridge.....University of Birmingham
Anthony Ladson.....Moroka, Australia
Amir Levy.....University of Keele
Jonathan Duncan MacKay.....British Geological Society, Nottingham
Mark McLaughlin.....Scottish Environment Protection Agency,Glasgow
Fiona McVittie.....Scottish Environment Protection Agency,Edinburgh
Joshua Mazurek.....Imperial College London
James Miller.....CEH Wallingford
Sabine Peukert.....Exeter University
Abdullahi Roble.....Scottish Environment Protection Agency, Edinburgh
Alexander Royan.....University of Birmingham
John James Weatherill.....University of Keele

EGU General Assembly

Vienna, Austria
22–27 April 2012



This annual event is one of the world's biggest multidisciplinary environmental science conferences. Held at the Vienna International Centre, attracting over 11 000 delegates from 95 countries, across hundreds of talks, poster sessions and meetings, it is impossible to give an overview of all the topics relevent to BHS members. However, this year five BHS Travel grants were awarded and we present here the personal accounts of those attending the meeting and the topics that interested them.

I. Alan Puttock's (University of Exeter) ongoing PhD project seeks to develop an understanding of vegetation change and fluvial carbon fluxes in semi-arid environments. This project works across multiple disciplines, investigating the relationship between ecology and hydrology and also using biogeochemical techniques to trace fluvial fluxes of sediment and carbon. Therefore, having the opportunity to attend one of the world's biggest multidisciplinary environmental science conferences was a fantastic opportunity.

Session GM6.2: Connectivity in water and sediment dynamics: how do we move forwards? (Convener **Anthony Parson**s, University of Sheffield) Connectivity is emerging as a central theme in my research, with changing hydrological connectivity over vegetation transitions appearing to have a significant implication for rainfall-runoff relationships and fluvial fluxes. It was therefore extremely exciting to see the work others are doing with this concept which is increasingly being used, but for which no standard theoretical or methodological framework exists. The talks in this session covered strategies to parameterise connectivity, with **Mike Kirkby** from the University of Leeds suggesting average travel times from runoff generating cells, average residence times and contributing areas as possible index variables which may be possible to use at the catchment scale. Other talks suggested the novel application of existing theories to understand and conceptualise connectivity: this included a fascinating approach by **Tobias Heckman** (University of Eichstaett-Ingolstadt) applying graph theory to sediment connectivity by viewing connectivity as a system property dependent on the relationship between nodes (landscape unit) and edges (connecting pathways).

Session HS2.8: Observational hydrology: Recent development in isotope and other tracer methods (Convenery **Christine Stumpp**, Helmholtz Zentrum München Institute for Groundwater Ecology). This session aimed to look at new and novel ways of using isotope and other tracing techniques to fingerprint and trace the source of water and sediment in catchments. Both the oral and poster sessions included excellent

use of isotopic characterisation to understand hydrological function.

An example of this is the work of **Christiane Ebert** from the Helmholtz Centre for Environmental Research who is developing multi-tracer techniques, including the use of $\delta^{18}O$ and $\delta^{2}H$ to allow for hydrograph source separation.

In addition to isotopes, other tracing techniques presented included the development of synthetic single stranded DNA markers by **Jan Foppen** from UNESCO-IHE Institute for Water Education and the use of fluorescent particle tracers by **Flavia Tauro** from the Polytechnic Institute of New York University. The latter presented an extremely interesting method for the cost-effective tracing flow on a range of scales from the rill to small channel using fluorescent particles (0.09–1 mm in diameter), UV lamps to illuminate them and a digital camera to record their transit.

SSS8.1: Ecology and Erosion (Convenery **Artemi Cerdà** from the University of Valencia)
This session, dedicated to the memory of Professor **John Thornes**, aimed to look at enhancing our understanding of the functional relationships between erosion and ecology in both directions. For my research, this seemed an ideal session for my poster and I am extremely grateful for having been given the opportunity to present my work on the relationship between semi-arid vegetation change and fluvial fluxes within it. Talks and posters within the session covered a wide range of environments and scales.

Talks by both **Tanja Mimmo** from the Free University of Bolzano and **Andrea Carminati** from the Helmholtz Centre for Environmental Research looked at the relationship between root exudates and soil structure and function. This session was closed by **Robert Hilton** from Durham University who gave an illuminating talk using $\delta^{15}N$ variability to illustrate that physical erosion can form a first order component in the nitrogen budget of mountain forests.

A final session of note was **HS5.8: Catchment science, management and stakeholder participation** (Convener **Mark Wilkinson**, Newcastle University)
Whilst most of the conference sessions logically focused on science being carried out by scientists, this session examined stakeholder and community engagement in hydrological research. This is an area that to some extent affects many people's research, whether it is working with land owners and funding agencies or trying to incorporate local knowledge and expertise. Because of this relevance, hearing from the practical experiences of others in issues (both positive and negative) working with stakeholders, outside of academia, was most enlightening.

In addition to the opportunity to present and discuss work in formal poster and oral sessions, EGU 2012 also provided the opportunity to meet and socialise with colleagues more informally. Many session and division organisers did an excellent job in organising dinners and evening socials. Of particular note was the soil and erosion dinner hosted by **Artemi Cerdà**, President of the EGU Soil Sciences Division. This was a highly enjoyable evening with the opportunity to chat with a large number of interesting people whilst sampling traditional Austrian cuisine.

Overall this was a fantastic conference to attend in a stunning city and I would recommend the occasion to any young hydrological scientist, both for the strength of hydrological work presented and also the simultaneous opportunity to learn about relevant multidisciplinary research. Of principal personal usefulness were the 90-minute poster presentations slots, which gave the opportunity to receive a large volume of feedback. If planning on attending EGU next year, I would strongly recommend applying for multiple poster presentations.

I thank the BHS again for providing me with the means to attend this conference. Abstracts and some posters and presentations for this conference can be accessed online at: http://www.egu2012.eu

Alan Puttock
University of Exeter



II. **Phillip Blaen** (University of Britstol) cites the following selection as a taste of some of the subject areas that were on offer:

Michael Zemp (World Glacier Monitoring Service, Switzerland) gave a preview of Volume X (2005–2010) of the 'Fluctuations of Glaciers' series that is currently being prepared for publication by the WGMS. The available dataset contains approximately 43 000 observations of a combination of front variation, direct glaciological and geodetic mass balances. Taken together, these can be used to assess whether glacier changes of the 21st Century are unprecedented as compared to those since the end of the Little Ice Age.

Seasonal dynamics in snow- and glacier-melt regulate river flow and stream water temperature in proglacial streams. A poster by **Kieran Khamis** (University of Birmingham, UK) outlined recent work on investigating the energy budget processes driving seasonal water column thermal dynamics in a glacier fed stream in the French Pyrenees. On average, net radiation was the largest heat source (~80% of total flux) and heat losses were minimal, highlighting the importance of considering a meltwater generation component in future heat budget models.

In alpine periglacial environments, the presence of permafrost can make it difficult to identify the origin of surface and subsurface waters and the main contributors to stream runoff. Research by **G. Zuecco** (University of Padova, Italy) suggests that water temperature can be used as an effective indicator of permafrost-related springs in these areas. Additionally, isotopic data suggests that runoff response appears to be mainly dependent on rainfall events during summer months following the loss of seasonal snowpacks.

In the McMurdo Dry Valleys of Antarctica, **Mike Gooseff** (Penn State University, USA) has been studying how hyporheic exchange influences biogeochemical cycling in glacial meltwater streams. He presented a poster on how multiple tracer approaches indicate that nitrogen and phosphorous uptake occur both in the channel and within the hyporheic zone under enriched conditions. Dry Valley streams are therefore thought to be hot spots for biogeochemical cycling within the Antactic desert landscape due to their strong hyporheic-surface water linkages.



Strong coupling between groundwater and surface water has also been observed in proglacial outwash plains in Iceland. A poster by **Amir Levy** (Keele University, UK) showed that groundwater levels increased following high episodic increases in river discharge in these systems. These results have implications for understanding hydrogeological responses to glacial retreat under a changing climate.

Tim Covino (Montana State University, USA) presented work on stream nutrient retention capacities in mountainous watersheds of varying land use development using the newly developed TASCC (Tracer Additions for Spiraling Curve Characterization) method to quantity uptake kinetics from ambient to saturated conditions. He showed that ambient nitrate concentrations increased more developed watersheds, but that resulting increases in biomass and retentive capacities in developed streams maintained low levels of nutrient export to downstream areas during baseflow.

Permafrost soils in the circumpolar Arctic regions contain vast amounts of carbon stored as organic matter, which could potentially be mobilized during the climate warming expected to be particularly severe in these regions. Research by **Gesine Mollenhauer** (AWI, Germany) in Svalbard suggests that total organic carbon in a soil profile of the annually thawed active layer exhibits increasing radiocarbon ages

with depth of 5800 conventional radiocarbon years (14C yrs BP) in 0 to 30 cm depth to 26000 14C yrs BP at 60–85 cm. She concluded that export of fossil terrigenous organic carbon derived from permafrost soils occurs in this region of Svalbard and is likely to integrate over the annually thawed depth, i.e. the active layer.

In large Arctic rivers, annual carbon export is dominated by the spring snowmelt event. **Rob Streigl** (USGS, USA) gave a talk on recent hydrochemical measurements taken before, during and after ice melt in the Yukon River. The rising limb of the spring flush hydrograph had the greatest bioavailable DOC content, relative to the remainder of the year. The bulk of the DOC exported in spring was of terrestrial plant origin and 14C modern. Interestingly, however, characterization of the DOC exported during the spring flush indicated the presence of labile atmospherically deposited DOC components having apparent fossil fuel combustion origin.

In addition to the oral and poster presentations, delegates attending this year's EGU meeting were able to visit the GeoCinema within the conference centre which showed a selection of short science-themed films on a daily basis. One of the highlights of the programme was Ice Crystals, which followed a French research team's efforts to understand the structure and formation of waterfall ice over the course of a winter in the Alps.

Finally, I would like to take this opportunity to thank the British Hydrological Society for providing a travel grant that allowed me to attend this year's EGU meeting. I am grateful to have had the opportunity to present my work and attend so many interesting and thought-provoking presentations in Vienna.

Phillip Blaen
University of Birmingham

III **Selma Guerreiro** (School of Civil Engineering & Geosciences, Newcastle University) was grateful for the opportunity to meet scientists with whom to hopefully collaborate with in the near future.

There were numerous interesting sessions occurring simultaneously and every session had interesting talks, but I can only highlight a few. On Monday **Paul Quin** (Newcastle University) talked about catchment systems engineering. This was particularly interesting due to his interventionist approach, stressing that each intervention in a catchment should have multiple benefits. For example; runoff attenuation features store and filter the water, aiding in flood prevention, but also improving water quality by inducing sedimentation. He also stressed the need to aggregate several small runoff attenuation features to have an impact at catchment level.

On Tuesday in the session "Assessment and management of water resources: Adapting to drought and water scarcity in tropical, dry land, and Mediterranean countries" the talk "Future droughts in Global Climate Models and adaptation strategies from regional present-day analogues" by **B. Orlowsky** (ETH Zurich) was particularly interesting. Using four drought indices and the CMIP5 ensemble of GCM simulations, they identified several hot spots of aggravating droughts in coming decades and concluded that several places in the world (parts of the US, Central Asia or Australia) will, in the future, present drought conditions similar to the present conditions in the Mediterranean.

Wednesday was a very interesting day with three excellent sessions. In the session "Extreme Events and Impacts" I especially enjoyed the first talk "A fivefold iIncrease in monthly heat records" by **S Rahmstorf** (Potsdam Institute for Climate Impact Research). Analysing 150 000 monthly time series worldwide they found an almost linear trend in the occurrence of heat records in the last 40 years. In the last 10 years there have been five times the amount of heat records expected under stationary climate, which means that every four in five events can be attributed to climate change or, in other words, there is 80% probability that a given heat record is due to climate change. This five-fold increase is a world mean, with some areas having up to 12-fold increase.

In the session "Hydrological change: Regional hydrological behaviour under transient climate and land use conditions" the talk "Quantifying uncertainty sources in hydrological climate impact Projections" was especially interesting. Using two emission scenarios, nine climate models (ENSEMBLES), two statistical post-processing methods (bias correction and delta change) and two hydrological models, they tried to assess uncertainty sources in discharge projections in the Alpine Rhine for 2021–2050. Most projections show an increase in runoff in winter and a decrease in summer but there is

large uncertainty in the magnitude of the changes. The climate models were the dominant source of uncertainty during most of the year but, in one of the scenarios, the hydrological models were the main source of uncertainty in the summer.

In the session "Drought and water scarcity: hydrological monitoring, modelling and forecasting" most talks were very interesting. The session opened with an invited talk given by **H.A.J. van Lanen**, Wageningen University, on the differences between drought and water scarcity and how the effects are different to distinguish. **M. Souvignet** (University of Bristol) gave an stimulating talk about "Model comparison for climate change impact prediction: does complexity actually matter?". Studying a mountainous dry area in the Andes (where data are scarce) they compared the performance of a lumped model (IHACRES), a semi-distributed model (SWAT) and a distributed model (J200). They concluded that the distributed model performed better, especially during low flows, and that the lumped model was not stable, sometimes predicting the right thing for the wrong reasons.

On Thursday I gave a talk entitled "Analysis of rainfall changes in transnational basins in Portugal and Spain" in the "Climate, Hydrology and Water Infrastructure" session. I performed change point and trend analysis on rainfall records. Significant decreases in rainfall were found for the months of February and March and significant increases in rainfall were found for October in some areas. The NAO index was considered as a possible explanation for the changes detected. It was demonstrated that changes in rainfall cannot always be interpreted as trends or change points because the pattern of change can be more complex. The danger of overestimating changes in rainfall by assuming that they take the form of linear trends was illustrated.



Friday had two very interesting session that unfortunately ran at the same time: "Regional Climate Modelling, projections and impacts (including CORDEX)" and "Precipitation uncertainty and variability: observations, ensemble simulation and downscaling". In the second session, the talk "Comparing Regional Climate Model output to observational data sets for extreme rainfall" given by **M.A. Sunyer** from DTU Environment was very stimulating. She used 15 RCM ENSEMBLES and three datasets: ECA (a point measurement dataset), E-OBS (gridded dataset) and ERA-Interim (a re-analysis dataset). She found considerable differences between the datasets for Denmark, especially for precipitation extremes. She also found that when comparing daily extreme rainfall in Denmark from an ensemble of RCMs with these datasets, the RCMs were found to be under- or over-estimating extreme rainfall, depending on the precipitation dataset used. She concluded that care must be exercised when assessing the performance of models, as the results may be very different depending on the datasets used.

For those of you waiting for the results of the EURO-CORDEX project (the successor of the ENSEMBLES working with resolutions of 0.44 º and 0.11º — around 12 km) be aware that the results of single model runs will not be available. Only when all the runs of the ensembles are ready will data be made available, which should happen early 2013!

Selma Guerreiro
School of Civil Engineering & Geosciences, Newcastle University

IV. **`Grace Garner** is a PhD student in the School of Geography, Earth and Environmental Sciences at the University of Birmingham. Grace's PhD research investigates the effects of a changing climate on river and stream temperatures within the UK; she presented two aspects of this research in an oral and a poster session at EGU 2012.

HS 2.13 Hydrological change: Regional hydrological behaviour under transient climate and land use conditions

This session concerned hydrological change and was split into two themes: the first was the role of climate and associated uncertainties; the second was the role of human impact and landuse. Papers associated with the first theme began with a solicited talk from **F. Ludwig** *et al*. (Wageningen University) who presented on the utility of multi-model approaches in providing more robust quantification of possible future anthropogenic impacts on the global water cycle. Further papers on this theme focused on identifying and quantifying uncertainty sources in hydrological predictions of river runoff (**M. Meurth** *et al*., Ludwig-Maximilians University; **T. Bosshard** *et al*., ETH Zurich), river flow **(J. Freer** *et al.*, University of Bristol) and mountain soil-moisture availability (**O. Rössler** *et al.*, University of Bern). During questions there were intense discussions on the suitability of statistical bias correction of model outputs to achieve better predictions versus physically based methods, and whether both methods were in fact sources of further uncertainty.

Papers presented on the second theme of the session applied a range of techniques to distinguish between the effects of land use and climatological changes on regional hydrological processes. **M. Renner** & **C. Bernhofer** (TU Dresden) compared two analytical frameworks (one based on Budyko curve functions and another on based on non-dimensional relationships between water and energy balances) for assessing the results of climate and land-use changes on streamflow. **V. Vanacker** *et al.* (University of Luvain) de-trended time series of rainfall and streamflow data influenced by ENSO-related changes in order to identify the influence of forest cover changes on each data set.

B. Galos *et al*. (Max Planck Institute for Meteorology) compared regional variability in the modelled effects of afforestation on mean temperature and precipitation in comparison to projected magnitude of change of the climate signal and its observed magnitude. **M. Weiß** and **B. van den Hurk** (KNMI, De Bilt) presented model results of the effect of global vegetation changes on global climate, with focus on evapo-transpiration and temperature.

I presented an oral paper on the climatic sensitivity of river temperature regimes within England and Wales (co-authored by **D.M. Hannah**, **J.P. Sadler** and **H.G. Orr**), in which techniques based upon conditional probability were used to quantify the links between the form and magnitude of annual air and river temperature regimes, and catchment processes used to explain regional variability in the strength of air-river temperature associations.

HS10.8/BG4.4 Environmental and anthropogenic change affecting catchments and groundwater-dependent ecosystems.

This poster session sought to assess non-stationarity of hydrological processes in a changing climate and incorporation of this understanding into models. This resulted in a multitude of modelling and experimental approaches being presented which were often contradictory but provided plenty of food for thought.

Pertaining to modelling approaches, **S. Pande** (Delft University of Technology) tested the hypothesis that Budyko curve functions at biome scale are a consequence of stable equilibriums of climate-soil-vegetation co-evolution using a two-stage multiple-regression process. **S. Schymanski** *et al.* (ETH Zurich) considered the problem of being unable to identify a set of parameters that "produce the right results for the right reasons" and the situation where improved process understanding has added new parameters but without improved predictive power.

Schymanski *et al.* used optimality theory to predict system properties without direct observations or calibration, which allowed more data to be available for model testing. In contradiction of this proposed modelling strategy, posters addressed also the requirement for improved process understanding. **C. Ceccherini** and **N. Gobron** (European Commission, DG Joint

Research Centre) presented on seasonal and spatio-temporal patterns of vegetation dynamics over Europe and proposed a new set of vegetation metrics for model use.

My poster (co-authored by **D.M. Hannah**, **I.A. Malcolm** and **J.P. Sadler**) compared stream temperature and heat flux variability between moorland and forested reaches to validate over seven calendar years existing conceptual models based on short-term observations (i.e. less than two years). One poster bridged the gap between process based understanding and modelling.

K. Khamis *et al.* (University of Birmingham) presented a hydro-meteorological study of the energy balance of an alpine, glacierised basin in the French Pyrenees over two summer melt seasons. These authors assessed the accuracy of measured fluxes and the predictive power of a deterministic equation for water column temperature which informed suggestions about the most important variables to include in such models.

I thank the British Hydrological Society for the opportunity to attend the EGU, communicate my PhD research and to attend such high quality and thought provoking presentations.

Grace Garner
University of Birmingham

V. Jefferson Wong (University of Bristol) presented a paper titled "Sensitivity analysis of hydraulic model to morphological changes and changes in flood inundation extent" in the session **NH1.6/HS4.7: Flood risk and uncertainty**. This session focused on reviewing state-of-the-art flood risk assessment methodologies on different scales and experiences of recent flood events, the physical processes during flood events and uncertainties in measurement data and modelling. I found it very resourceful to hear about the different approaches and aspects that other researchers are using to address and quantify uncertainties in flood risk assessment.

Alessio Domeneghetti (University of Bologna, Italy) gave an insightful talk about the sources of uncertainty in inundation mapping, namely, upstream and downstream boundary conditions, and uncertainties in the dike-failure location and breach morphology. **Clemens Neuhold** (University of Natural Resources and Life Sciences – BOKU, Austria) highlighted the benefits of integrating additional data sources and processes to standardized Flood Risk Assessment (FRA). These sources and processes included the consideration of a broadened range of scenarios from 'no damage' to 'worst case', the consideration of morphological river bed variability, the definition and evaluation of failure scenarios and the implementation of in-field mapping information and interviews. Both scientists shared the same idea of incorporating changes in river morphology into flood modelling and subsequent FRA. This echoed to my interest in investigating impacts of morphological changes to flood inundation extent and proved that the consideration of morphodynamics on flooding is of growing interest among the flood modelling communities.

Another session that I found particularly interesting and relevant to my work was **HS4.2: Hydrological forecasting: challenges in uncertainty estimation, data assimilation, post-processing, real-time control and decision-making**. This session addressed methods for estimating predictive uncertainty, its reduction through data assimiliation, improved model formulation and error correction, and its use to support operational decision-making in flood warning and water management. "A comparison of three uncertainty processors (HUP, BMA and MCP) in the normal space" presented by **Ezio Todini** (University of Bologna, Italy) and "Comparing simple methods for predictive uncertainty estimation over 1000 French catchments" by **Francois Bourgin** (Irstea/Cemagref, Centre d' Antony, UR HBAN, France) provided a fascinating account of various techniques on uncertainty quantification. Their works were of significant utility to hydrological and hydraulic scientists in a modelling context. This was particularly beneficial to me, as I am interested in building up a modelling framework to account for sources of uncertainties from river morphology.

Even though not completely related to my current field of research, I also went to a number of talks that were very interesting and inspiring. Some of these included: a thought-provoking case study of erosion and deposition mapping titled "Spatial and temporal patterns of bank failure during extreme flood

events: Evidence of nonlinearity and self-organized criticality at the basin scale?" by **Jacqueline Croke** (Griffith University, Australia); an interesting presentation of erosion model comparison named "Addressing the time-scale gap in erosion modelling — comparison of an event-based and a landscape evolution model" by **Jantiene Baartman** (Wageningen University, The Netherlands); and "Do not only connect" by **Mike Kirby** (University of Leeds, UK) who gave a compelling talk on the concept of overland flow connectivity. These talks not only enriched my knowledge of fluvial morphology but also put forward many new ideas I could go away with.

The EGU also offered a great opportunity for networking, especially during the poster sessions as these allowed proper time for discussion with the poster authors and exchange of ideas. Also, the sessions enabled me to meet a number of new researchers from across the world that shared the same research interests as mine. Two of the many posters I found particularly interested in were "Development and comparison of Bayesian modularization method in uncertainty assessment of hydrological models" by **Li Lu** *et al.* (University of Oslo, Norway) and "Monitoring and risk identification caused by high water, floods and erosion processes in urban part of Sava Riverbed" by **Dijana Oskoruš** *et al.* (Meteorological and Hydrological Service of Republic Croatia (Hydrology Division), Croatia).

Overall, the conference was an interesting occasion of incalculable value to be exposed to the latest research in my field, provoking in me different inspiration and understanding of the current context of my research. Often research published in journals is delayed by months or years, and it is exactly the meaning of participating in conferences which can provide an early route to get in touch with state-of-the-art research. Therefore, I would like to express my gratitude to BHS for providing me with the financial support that enabled me to attend and participate in such a diverse and engaging conference and for the opportunity to write about my experiences.

Jefferson Wong
University of Bristol



Society of Freshwater Science Annual Meeting

Louisville, Kentucky, USA 20-24 May 2012

The 60th annual meeting of the Society of Freshwater Science (SFS) was the society's first with a new name, the organisation having previously been the North American Benthological Society (NABS). In his opening address, President **Joe Holomuzki** explained how this change, as well as the reincarnation of the society's journal as *Freshwater Science*, reflected the organisation's increasingly wide-reaching and international research interests.

The theme of the meeting was Freshwater Stewardship: Challenges and Solutions. From the opening session, a key element implicit within this theme was the need for research-active members to pursue opportunities to use the new knowledge they generate to benefit real-world ecosystems impacted by human activity. **Joe Holomuzki** emphasized that the greatest benefits for freshwater ecosystems will come when ecological researchers engage with those in other disciplines, for example climatologists, as well as with non-scientists including politicians and regulators. The environmental improvements that can be achieved through such interactions were brought home by **Jerry Jacobi**, winner of the 2012 Environmental Stewardship Award. Society members were pleased to learn that after several years of lobbying, Jerry's aim of restoring flow to the Santa Fe River in New Mexico has met with success and legislation has been enacted to prevent the river from being regulated dry.

The theme of looking beyond our own scientific research to consider the social, political and economic landscape in which our work sits was again emphasized in the Plenary Sessions. **David Hart** (University of Maine) explained how he has attempted to reconcile the concerns of a diverse range of stakeholders to address environmental problems through Maine's forward-thinking Sustainability Solutions Initiative.

Ellen Gilinsky (U.S. Environmental Protection Agency), speaking in the same Plenary Session, described how some major environmental problems currently faced by U.S. freshwaters are being addressed by collaborations between scientists and regulators. The problems highlighted included nutrient pollution of groundwater and 'Mountaintop Mining', which involves the removal of mountaintops to expose coal seams, releasing many pollutants into sensitive headwater streams.

Richard Kingsford (University of New South Wales) had a rather different perspective on working with non-scientists, stemming from his experience of trying to restore the ecological integrity of over-abstracted rivers in the Murray-Darling basin, Australia. He noted the challenge of balancing ecological aims with economic activities, and highlighted the importance of communicating the results of research not only in scientific journals, but also in mainstream media.

Seven concurrent sessions were held each day, with a diversity of topics covered, including Hydro-ecology, Large River Ecology and Stream Fragmentation. Two sessions related to climate change, including Predicting Sensitivities to Climate Change from Species Traits. Highlights of this session included **Wendy Monk** (Canadian Rivers Institute), whose research uses large-scale, long-term datasets to investigate how analysis of species traits (such as swimming ability and occurrence in the drift) and taxon occurrence can be used to improve understanding of linkages between climatic variability and hydrological hypotheses. **Stan Gregory** (Oregon State University, USA) reported research from the Willamette River, which is inhabited by 35 native and 31 non-native fish species, the latter group including several species that tolerate warm water. Stan highlighted

the importance of hyporheic exchange flows in providing cool water refuges for native fish.

Later, **Mark Ledger** (University of Birmingham) addressed a topical issue in the UK, and in many countries around the world: drought. Mark's research group have used the Freshwater Biological Association's River Laboratory in Dorset to investigate the effects of drought, and in particular flow intermittency, on invertebrate food webs in stream mesocosms. A key result from this research was the occurrence of simplified food webs that included less rare taxa in drought-impacted mesocosms.

Later in the week, **Dave Arscott** (Stroud Water Research Centre), **Thibault Datry** (Irstea, France) and colleagues chaired the session 'Research Advances and Conservation Challenges in Temporary River Systems'. This was another session with considerable relevance to UK rivers, considering the recent drying of drought-impacted 'perennial' streams in the south of England. Highlights of this session included Thibault Datry, whose analytical research has recognised that in many countries around the world, similar patterns of declining invertebrate diversity are observed as flow intermittence increases.

Considering how we might monitor the health of such intermittent systems, **Cath Leigh** (Australian Rivers Institute) proposed considering the fauna within the subsurface sediments of the hyporheic zone as useful biomonitors. My paper also considered the importance of the hyporheic zone, as well as groundwater springs, as refuges that promote invertebrate persistence during drought in perennial streams.

In conclusion, the Society of Freshwater Science's new name effectively represents the international nature of this organisation. The conference provided an excellent opportunity for global researchers, in particular those from North America, Europe, Australia and New Zealand, to exchange ideas and form new partnerships. A feeling of genuine excitement was generated by many of the presentations and researchers used the meeting as a chance to develop new collaborations which we hope will last for many years.

Rachel Stubbington
Nottingham Trent University

32nd International School of Hydraulics

Lochow Palace, Poland
28 May – 1 June 2012

I spent a week in Poland at the end of May 2012 attending the 32nd International School of Hydraulics (ISoH) in Lochow: I also visited the Institute of Geophysics (IGF), Polish Academy of Sciences, in Warsaw. This year's ISoH was the 5th international version of the School. For 25 years until 2005 it had been a purely internal Polish event, but from 2006 onwards it has more or less alternated annually between the international and internal versions. The aim of the international version is to bring together about 50 researchers from around the world to present and discuss work on hydraulics (including hydrology and water resources). As with the previous four international versions, this year's School (http://sh.igf.edu.pl/) was organised by staff of the IGF under the chairmanship of the institute's director, Prof Pawel Rowinski. The organisation was faultless and it is worth recording thanks to Pawel and his organising committee (Anna Lukanowska, Anna Zdunek, Monika Kalinowska & Magdalena Mrokowska).

The conference venue was the Lochow (pronounced warhoof) Palace – see group photo on next page –which is located east of Warsaw. On the morning of Monday May 28th delegates either found their own way there or caught the conference coach from a meeting point in central Warsaw. Due to a

tunnel collapse on the metro extension works near the meeting point, the expected 60 minutes journey took closer to 90 minutes. Nevertheless delegates arrived with enough time for registration and lunch before the opening of the conference. The Lochow Palace has been recently renovated from a rather ruinous state and now provides excellent conference facilities on a self-contained site. Delegates were housed in several buildings offering good quality, en-suite accommodation. Breakfast, lunch and dinner were provided in a spacious dining room: the food was excellent throughout.

There was a truly international flavour to the conference with delegates from several European countries, Mexico, USA, India, Russia and Egypt. The UK delegates included Donald Knight, Vladimir Nikora, Ian Guymer, James Hart, Virginia Stovin, Fred Sonnenwald and myself. A few of the Polish delegates would be known to members of the Society, in particular **Jaroslaw Napiorkowski** and **Renata Romanowicz**, from their contributions to Irish and UK hydrology.

The papers were of two types: hour long 'lectures' from invited speakers and 20 minute 'presentations' of submitted articles. All papers were reviewed by members of the conference's Scientific Committee (comprising about a dozen European experts) before the event, with feedback being provided so that finalised manuscripts could be submitted within one week of the end of the conference. The proceedings will be published by Springer as *Experimental and Computational Solutions of Hydraulic Problems*, in November 2012 (ISBN 978-3-642-30208-4).

Pawel Rowinski opened the conference by welcoming everyone and explaining a little of the history of the event. He then presented the first Lecture which was devoted to the career of Prof **Wlodzimierz Czernuszenko** (IGF, Poland), one of the elder statesmen of Polish hydraulics and, as argued in the presentation, one of the founders of eco-hydraulics. The talk also commented on the influence of the political changes experienced by Prof Czernuszenko since his birth in the late 1930s, e.g. the German and Russian occupation of Poland in 1939, the Warsaw Uprising of 1944, the post-war Soviet domination, the rise of Solidarity, the martial law years of the 1980s, the 1989 revolution and finally complete independence. The celebration of fifty years of work on fundamental hydraulic issues such as turbulence,



mass transport and particle transport, together with leadership in the integration of knowledge between the two sides of the iron curtain since 1989 was richly deserved. In a brief discussion some personal tributes were offered by **Vladimir Nikora**, **Donald Knight**, **Andrea Marion** and **Wojciech Majewski**. The other two papers in the session covered some of Prof Czernuszenko's latest work and were presented by his co-workers **Alexey Rylov** (Trianon Co., Russia) on velocity distributions in 3D rough turbulent flow and **Robert Bialik** (IGF, Poland) on 2D Lagrangian modelling of saltating sediment grains.

The next session opened with two papers on mixing: the first was presented by myself on dispersion and transient storage modelling in rivers; the second was presented by **James Hart** (Warwick University, UK) on dispersion in pipe flow. The session finished with a case study paper by another elder statesman of Polish hydraulics and hydrology, **Wojciech Majewski** (Institute of Meteorology and Water Management, Poland), who described many aspects of the Wloclawek hydraulic project. As part of a 40-year old plan to exploit the lower Vistula river for hydro-energy and navigation purposes, the Wloclawek project is now very controversial due to ecological and sustainability issues. The day ended with an Ice Breaking Party consisting of a barbecue, beer and mosquitoes.

I chaired the first session of the second day, which contained three papers on flooding issues. Firstly, **Donald Knight** delivered the Keynote Lecture which emphasised the continuing need for integrating mathematical modelling with experimental work (in the field and the laboratory) so that predictions from increasingly more sophisticated software can be authenticated. He illustrated this theme with reference to the Conveyance Estimation System which evolved from the pioneering Shiono-Knight Model of the early 1990s for evaluating transverse velocity profiles in rivers. As well as enabling much improved frictional resistance, bank-full capacity and stage-discharge estimations, Society members may be unaware that this work also has important implications for estimating dispersion coefficients in rivers.

The next paper was presented by **Ahmed Sattar** (Cairo University, Egypt) on experimental investigations of flood levee breaches: it also considered the design of sand bags for effective breach closure. The final paper was delivered by **Iwona Markiewicz** (IGF, Poland) on flood frequency analysis. Having commented on the lead role of statistics rather than hydrology in this topic, she pointed out that practising hydrologists are mostly interested in having unique flow rate estimates and show little interest in the accompanying uncertainty estimates that the statistical analyses provide. Perhaps a different approach is called for?

The next session concerned sediment transport issues. Firstly **Andrea Marion** (Padua University, Italy) delivered a lecture on a new framework for describing incipient sediment motion. The novelty of the work described lay in using a probabilistic framework first proposed by Grass supplemented with detailed experimental flume measurements and discrete particle modelling. As a result, the work provided detailed insight into the stochastic nature of the processes at work: the stochastic equations of incipient motion were also derived.

This was followed by a presentation concerning the modelling of fluid velocity over bed-forms from **Mikolaj Karpinski** (IGF, Poland). In contrast to previous work on this topic, which has been based on Large Eddy Simulations or numerical solutions of the Reynolds-averaged-Navier Stokes equations, a method using a Lattice Boltzman Cellular Automaton Model was described. The results were in good agreement with field measurements over sand dunes.

The final paper was presented by **Peter Geisenhainer** (Technical University of Braunschweig, Germany) on a physical scale model study of propeller induced scour. The experimental results confirmed previous work that indicated the importance of propeller characteristics, rudder alignment and sediment characteristics in determining scour development and scour geometry. It was also found that a Kaplan propeller in a Kort nozzle and double rudder created larger scour depths than a Wageningen B-series propeller with a central single rudder.

Following lunch, three papers on rather different hydraulic issues were presented. Firstly, **Subhasish Dey** (Indian Institute of Technology, Kharagpur) gave a lecture on the hydrodynamics of undular free surface

Image courtesy: ISoH organising committee.

flows. This described a theoretical analysis of three situations: a hydraulic jump on a plane smooth boundary; flow over a single hemi-cylindrical bed form; and flow over a sinusoidal channel bed. The next paper concerned the physical modelling of a flow diversion structure being designed to protect Villahermosa City from flooding from the Sierra river, and was presented by **Fabian Rivera-Trejo** (Juarez Autonomous University of Tabasco, Mexico).

The third paper was presented by **Oscar Herrera Granados** (Wroclaw University of Technology, Poland) and concerned an experimental study of the effect of seepage on turbulence in open channel flows. Although the seepage flows were less than 0.03% of the channel flow, observable effects on the instantaneous and time-averaged channel flow parameters were found.

In the next session, three papers on flow and pollution modelling were presented. Firstly, **Fred Sonnenwald** (Sheffield University, UK) described a study aimed at identifying a suitable correlation measure for assessing a maximum entropy deconvolution method for analysing solute transport data. Twelve very different correlation measures were studied. Three non-dimensional measures were found to be the most suitable for both model identification and model evaluation. Secondly, **Monika Galek** (Cracow University of Technology, Poland) presented a two-dimensional depth averaged modelling study of the Dobczyce retention reservoir. The models RMA2 and RMA4 were used to simulate flow and pollutant transport. Thirdly, **Magdalena Trzewik** (Cracow University of Technology, Poland) presented a two-dimensional depth averaged modelling study of the Porabka retention reservoir. The model FESWMS was used to simulate how the operation of a pumped-storage hydroelectric plant influences flow patterns in the reservoir.

In the day's final session one more paper was presented and an information seminar was held. The paper concerned the exploitation of ground water for Mexico City's water supply and was presented by **Gerado Ruiz** (National Automonous University of Mexico). The paper described an information system of well water levels aimed at improving the understanding of the behaviour of the local aquifer supplying the Metropolitan area of Mexico City. The information seminar was presented by **Vladimir Nikora** (Aberdeen University, UK) in his capacity as editor of the *Journal of Hydraulic Research* (http://www.tandf.co.uk/journals/tjhr). Vladimir reviewed the scope of the journal, explained the current editorial policy and described the events that would ensue following submission of a paper. He was particularly keen to encourage early career researchers not only to submit papers but also to act as reviewers, noting that reviewing papers is a good way of learning about good and bad practice in paper writing.

After dinner, those who were interested took part in a ceramics workshop, creating several interesting objects. Other delegates amused themselves, some showing particular initiative when it was discovered that the bar wouldn't be opening!

The third day started with a lecture from **Vladimir Nikora** (Aberdeen University, UK) concerning the role of hydrodynamics in improving the management of aquatic ecosystems. The presentation distilled various ideas emanating from discussions with several colleagues over a number of years. A key issue was "how do ecosystems affect flow over multiple scales and vice versa?" He presented an inspirational view of how we might investigate such matters, and emphasised the importance of working in multi-disciplinary teams (e.g. a coalescence of ecologists, hydrologists, geomorphologists and hydraulicians) right from the very earliest stages of research project formulation.

The eco-hydraulics theme continued in the next paper which discussed the interaction between changes in flow regimes and changes in ecosystems. Presented by **Andrzej Struzynski** (University of Agriculture in Cracow, Poland), the paper argued that following anthropogenic changes to river systems there could be difficulty in identifying appropriate reference conditions for assessing the ecological status of rivers under the Water Framework Directive. Bed stability was identified as a possible hydromorphological parameter that could be of use in this regard, and some early results from three Carpathian rivers were discussed.

The next paper was presented by **Magdalena Mrokowska** (IGF, Poland) and concerned the role of uncertainty in the measurement of river hydraulics. Noting that most such measurements are not repeatable (due to continual changes of conditions on a range of timescales)

many of the standard statistical approaches can't be implemented. Simpler approaches based on, e.g. the maximum deterministic uncertainty concept, were suggested. The early stages of the application of these ideas to the indirect measurement of friction velocity during river floods were discussed.

Opening the next session, **Roberto Gaudio** (Universita della Calabria, Italy) gave a lecture on the non-universality of von Karman's constant. The speaker presented a historical review of the classical work on turbulent flow over solid boundaries. He went on to argue that although the universal logarithmic velocity profile law containing a value of 0.41 for von Karman's constant is widely accepted, there is much evidence that smaller values (often as low as 0.3 and in certain circumstances even lower) are appropriate for some fluvial flows. In particular, such conditions are found for streams with low relative submergence of roughness elements or in sediment laden (bed load and/or suspended load) flows.

The second presentation of the session was given by **Andrzej Aniszewski** (West Pomeranian University of Technology, Poland) on 2D mathematical modelling of reactive contaminant transport in groundwater. The aim of the study was to evaluate the relative importance of several physical, chemical and biological processes for a case study site. The final presentation of the session concerned the impact of mineral composition on the erosion resistance of cohesive sediments: the paper was presented by **Ahmed Sattar** (Cairo University, Egypt). Following the laboratory analysis of 48 soil samples from various Egyptian locations, Gene Expression Programming techniques were used to identify the non-linear relationship between the critical shear stress for erosion and the clay mineral content of the samples.



Image courtesy: ISoH organising committee.

Prof Czernuszenko (rear) and Prof Knight

After lunch **Artur Radecki-Pawlik** (University of Agriculture in Cracow, Poland) gave a lecture on the use of rapid hydraulic structures in mountain streams. He explained the debate amongst various professionals on the application of hydraulic structures designed to provide flood protection and to prevent sediment erosion whilst preserving river beds in their natural state. Field studies on existing artificial rapid hydraulic structures were described aimed at improving their design and construction, and ameliorating their impact on fish and macroinvertebrates.

The presenter of the next paper was absent, but **Ian Guymer** (Warwick University, UK) volunteered a presentation on vertical variations in hyporheic exchange rates in open channel flows. The third paper in the session was delivered by **Pawel Hachaj** (Cracow University of Technology, Poland) and described a 'river memory' effect. He described observations from man-made lakes and reservoirs that suggest that flow patterns may somehow be influenced by a memory of the old river bed in the bathymetry of the water body. Bearing in mind that the flow velocities concerned are very small, a theoretical treatment involving the replacement of the Newtonian linear turbulent viscosity model with a more sophisticated modified form of the Stribeck viscosity formula (appropriate for friction between lubricated surfaces) was proposed. The presentation was very entertaining and delegates were unsure as to how serious the speaker was (in conclusion he noted that his simulations suggested that his case study reservoir had rather a bad memory!): could the phenomenon actually be true or were we having our leg pulled?

The next session began with a paper from **Jerzy Machajski** (Wroclaw University of Technology, Poland) who described a numerical modelling study of a side-channel spillway on the Pilchowice storage reservoir. Various options for the replacement of the existing

structure were analysed to ensure an improved hydraulic performance in the light of enhanced reservoir safety. The next paper was presented by **Apoloniusz Kodura** (Warsaw University of Technology, Poland) on using cavitation to treat ship ballast water. He explained that treating ballast water before releasing it to the sea has become a major issue because its release is a possible mechanism for ecological pollution, i.e. the transfer of species of micro-organisms to water bodies where they do not naturally occur.Following proof-of-concept laboratory tests, experiments in the field were showing that creating cavitation in the ballast water could eliminate up to 80% of the micro-organisms.

The presenter of the next paper was absent, but **Virginia Stovin** (Sheffield University, UK) was on hand to present some work on CFD simulations on mixing in, and on pollutant residence time distributions in, urban drainage system manholes.

There were two presentations in the final session of the conference. Firstly, **Mateusz Strutynski** (Agriculture University in Cracow, Poland) talked about the influence of large roughness elements on morphological changes in mountain river beds. He described field studies on three rivers in the Carpathian mountains, which were aimed at establishing the influence of local hydraulic processes on the habitats of fish species. Secondly, **Pawel Zawadzki** (Poznan University of Life Sciences, Poland) discussed the performance of a series of new flow strainers for pipes. The new design, incorporating an increased screening surface of the filters as well as an improved shape of the filter bodies, has resulted in a significant increase in the flow coefficient compared to existing products.

Finally, the conference chairman drew the formal proceedings to a close by thanking the organising committee and the delegates for all their hard work.



Image courtesy: ISoH organising committee.

The reporter (right) and Russell Manson enjoying the dinner

He also reminded everyone of the conference dinner taking place that evening and of arrangements for the study/sightseeing tour and alternative options for the return to Warsaw on the following day. I should also report that throughout the conference there was a brief period of discussion of each paper after each presentation, and that Vladimir Nikora and Andrea Marion, in particular, made several valuable contributions in this regard. Society members will find all the presentations on the conference website (http://sh.igf.edu.pl/).

In the morning delegates left Lochow after breakfast. Most joined the study/sightseeing tour which comprised an hour or so drive back to Warsaw, a 2-hour boat trip along the Vistula River in central Warsaw, lunch and an hour or so guided walk around Warsaw's re-constructed historic centre. During the boat trip the tour guide described various relevant features of the river front such as flood protection measures, water supply intakes, wetlands, entrances to port facilities, features of several bridges connecting the western and eastern parts of the city, etc. With some delegates needing to catch trains and planes (if not automobiles) a smaller group went on the guided walk after lunch. The coach (complete with delegates' luggage) that had brought us back from Lochow was conveniently parked near the end of the walk and offered a final drop-off at the central railway station/bus stop for the airport.

In summary, I enjoyed the conference very much and would recommend Society members to consider attending the next ISoH in 2014. The event succeeds in providing an informal but scientifically robust atmosphere, which is ideal for PhD students and early-career researchers, in particular, to present their work. I am confident that the organisation of the next School will maintain the admiral

standards achieved during this and previous events.

I spent most of the following day (Friday June 1st) at the IGF, which is easily found by tram or bus from the city centre. For the morning we had organised a planning meeting for some (more) joint work on solute transport modelling in rivers between IGF staff (Jaroslaw Napiorkowski, Renata Romanowicz, Marzena Osuch) myself and my long-term collaborator, Russell Manson (Stockton College of New Jersey). Following lunch at IGF I had further discussions with several of the staff/ researchers/PhD students to discuss other joint interests. I can wholeheartedly recommend IGF as a partner for international collaboration: my collaboration with Pawel Rowinski, Jaroslaw Napiorkowski, Renata Romanowicz and others since 2004 has been a most valuable and rewarding experience.

I spent Saturday in Warsaw, including a visit to the Museum of the Warsaw Uprising (which I strongly recommend, although several visits would be required to take it all in). I returned to Edinburgh the following day.

In conclusion I would like to thank the Society for its financial support. I am confident that the time spent in Poland will lead to further collaboration with our Polish colleagues in the coming years.

Steve Wallis
Heriot-Watt University

Editorial

BHS 2012 at Dundee — a most enjoyable meeting but sadly, rather a lot of gaps in the usual attendance.

What did I learn?

• That despite more and more field and theoretical studies, the natural variability in hydrological drivers outweigh any 'improvements/mitigations' identified.

• That a lot of current work appears to be going over the same ground as many earlier workers. The good thing is that the resuslts appear to yield the same answers.

I was intrigued at the surprise shown by some that hydrology is so complex since for many of us that is exactly what hooked us in the first place!

Celia Kirby

MSc Studentship Competition

The academic year just closing was the first without any NERC Studentships available for MSc courses and also the first in which we ran the BHS-JBAT MSc studentship award scheme. The three recipients, Sharla McGavrock, Susan Mickey and Jade Ward have all submitted interim reports and we are delighted that they are so pleased with their progress:

"My enthusiasm for hydrology has grown throughout the year....."

"It has definitely been a privilege to learn from and have lively discussions with staff members whose papers I had read....."

"The course has equipped me with all the essential skills and knowledge that I need to start my career....."

We are running the scheme again this year — prospective recipients please note that the deadline* for submissions is nearly upon us — so it was salutary to read a comment that the effect of withdrawal of NERC funding has already been noticed, with one of this year's courses only having half the students it had last year.

*20th August 2012 – see http://hydrology.org.uk/news.asp

UK Hydrological Bulletin: May – July 2012

2012 thus far has been remarkable in hydrological terms – the scale of the transformation from severe early spring drought conditions to widespread and sustained flooding through June and much of July is without modern parallel across much of the country.

Following two successive dry winters and the UK's lowest March rainfall since 1953, river flows and groundwater levels were exceptionally depressed over wide areas. There was considerable concern both for the water resources outlook and the drought's impact on agriculture and wildlife. Subsequently, with the Jet Stream now following a persistently southerly track, the wettest April on record initiated a dramatic hydrological transformation which, at a critical time in the drought's development, decisively reversed the normal seasonal decline in runoff and recharge rates.

Outflows from England &Wales for late April and early May were the highest in the 62-yr national series (Figure 1) and flood warnings were very common, particularly for the late spring. May was cool and cloudy with monthly rainfall totals generally in the normal range but, with modest evaporative demands and saturated soil conditions, the rainfall was unusually hydrologically effective. Exceptional runoff rates during the first fortnight helped replenish parched wetlands and extend the drainage network into the previously dry headwater reaches of many rivers, but they also presented further problems for wildlife (e.g. the inundation of nesting areas in the Ouse Washes and Fairburn Ings near Castleford). Flows declined through the latter half of the month but the previous maximum May outflow for England & Wales was still comfortably exceeded.

As a consequence of the abundant late-spring runoff, and contrary to the normal seasonal trend, reservoir stocks began a sustained recovery (Figure 2). In addition, the very unusual extension of the recharge season well beyond the spring triggered a late recovery in groundwater resources — from an exceptionally low base in many areas. However, local differences in rainfall amounts, the depth to the depressed water-tables, and particularly, the storage characteristics of individual aquifer units made for markedly different timing in the onset and rate of recovery. Notable May increases in groundwater levels were recorded for the South Downs, with rises of more than 10 m recorded, for example, at Compton (West Sussex). However, more muted responses typified most of the less-fissured Chalk outcrop and very low levels continued to typify some index boreholes in the

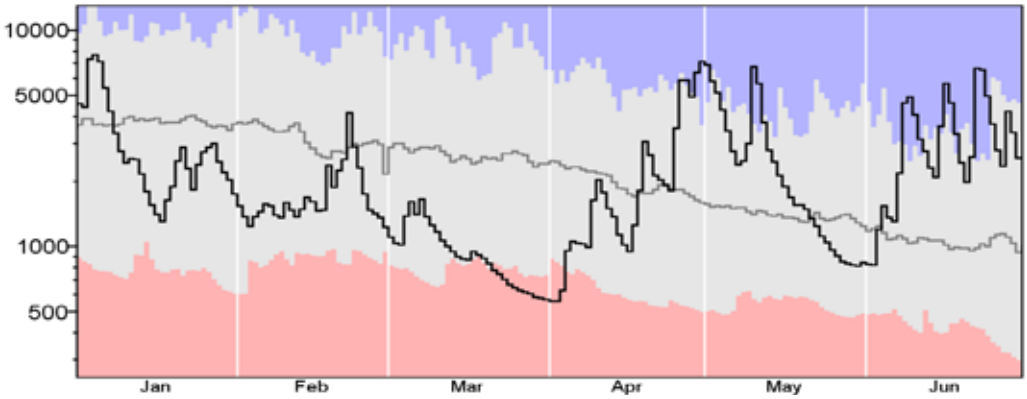


Fig 1 *2012 daily outflows from England & Wales with daily max., min., and mean (based on the 1961–2011. record)*

North Downs, Dorset and parts of the Chilterns.

A continuing sequence of vigorous Atlantic frontal systems ensured that weather conditions during June, and continuing into July, were aggressively autumnal. The Western Isles were an important exception: with rain-bearing low pressure systems diverted to the south, the notable spring rainfall deficiencies increased further and, with loch levels depressed, whisky production was interrupted (e.g. on Islay and Skye). Elsewhere, many new maximum June rainfall totals were reported — in part reflecting the frequency of exceptional storm totals over a wide range of durations. A reported 48-hour total of 186 mm near Aberystwyth on the 8/9th resulted in the River Rheidol exceeding its previous maximum level by a wide margin; flows in the neighbouring Ystwyth closely approached the maximum in a series from 1963. With the flooding accentuated by high tide levels, approximately 1000 people were evacuated. Floodplain inundations were both widespread and frequent, necessitating the movement of livestock to higher ground. Flash flooding was particularly common during the third and fourth weeks and impacted most severely across northern England. On the 28th, both the east and west coast rail links to Scotland were closed due to landslides; a number of cliff slippages (e.g. in Dorset) were also reported.

Rivers registering new maximum June runoff totals showed a very wide distribution from the Clyde to the Exe and the Bush (Northern Ireland) to the Great Ouse. Unsurprisingly, estimated June outflows from Great Britain exceeded the previous June maximum by a wide margin. Across much of the major aquifers June rainfall totals were around twice the 1971–2000 average and with remarkably low soil moisture deficits for the time of year, groundwater

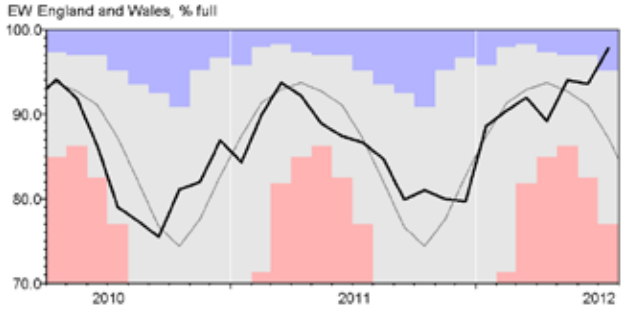


Fig 2 *Estimated overall reservoir stocks for England & Wales with monthly max., min., and mean (based on the 1988–2011 record)*

level recoveries gathered momentum. However, the varying responsiveness of individual aquifer units meant that whilst new maximum June levels were reported in parts of the southern Chalk (and the Carboniferous Limestone in Derbyshire), levels in the Permo-Triassic sandstones at Heathlanes (Midlands) continued to track marginally below previous minima — in a 40-year series.

Exceptional rainfall and runoff rates continued into July, impacting severely on transport, agriculture and leisure pursuits. Convective activity produced some damaging hailstorms and a number of exceptional rainfall totals. In Ayrshire, on the 5th, a 90 mm total was recorded in three hours (including a 20.6 mm deluge in 15 minutes). Low pressure continued to dominate synoptic patterns and provisional data indicate that by mid-month, the previous maximum UK rainfall for April–July had been clearly eclipsed. Accordingly, levels in most reservoirs had risen close to capacity and overall stocks for England & Wales were at a level seldom reached even during wet winters. The remaining hosepipe bans in southern England were lifted on the 9th.

Aquifer re-charge, normally very meagre in mid-summer, was substantial and the impact of locally intense rainfall contributed to an increased risk of groundwater flooding in some areas (e.g. in Dorset), serving as a warning of a possibly more widespread threat later in the year. By contrast, groundwater levels remain relatively depressed in a few slow-responding aquifers (in the Chilterns particularly where flows in spring-fed streams also remain below average). The full impact of the recent recharge will not be evident until the water currently in the unsaturated zone reaches the water tables.

The remarkable temporal contrast in synoptic patterns during 2012 is reflected in the comparison between the Jan–Mar and Apr–Jun rainfall totals for England. The ratio (1:2.6) has not been approached in the NCIC[1] series from 1910, and is probably unmatched in the last 230 years at least. The hydrological contrast is equally

[1]National Climate Information Centre, Met Office

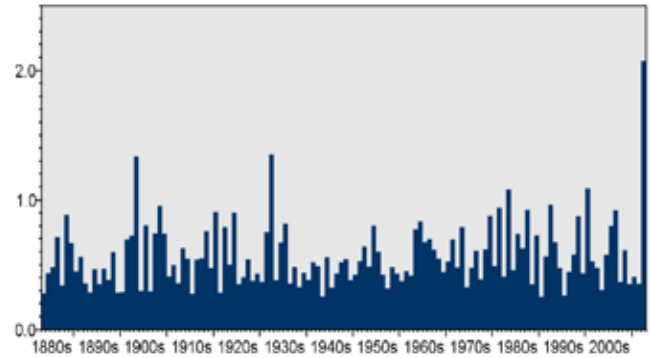


Fig 3 *River Thames at Kingston: ratio of Apr–June to Jan–Mar runoff (based on naturalised flows)*

compelling, and is exemplified by the Thames where flows have been measured since 1883. Higher June runoff totals following a protracted drought episode were recorded in 1903 but, in 2012, the ratio between the April–June runoff and that for January–March was the highest in the 138-year record (Figure 3). Hydrological droughts very rarely terminate in the summer but the unprecedented late spring and early summer rainfall has dramatically transformed the water resources outlook.

For more details please visit

National Hydrological Monitoring Programme: http://www.ceh.ac.uk/data/nrfa/nhmp/nhmp.html

Terry Marsh
Centre for Ecology & Hydrology
25/07/2012

Book Review

Rainfall–Runoff Modelling The Primer (2nd edit.)

by Keith Beven
published by John Wiley & Sons, 2012. 488 pp
ISBN 978-0-470-71459-1 - £45.00

This book is an advanced introduction to rainfall-runoff modelling suitable for post graduate students and researchers. The author has reviewed many rainfall-runoff models and provided a good set of references if the reader needs to explore a topic in more depth. Of particular interest to students will be the list of rainfall-runoff modelling software that can be downloaded from the internet.

One of the aims of this book is to train the reader to evaluate models, not only in terms of how well the model can reproduce the test data, but also by critically assessing the assumptions made. The author states that the ultimate aim of prediction using models must be to improve decision-making about an applied hydrological problem rather than just focusing on research as a means of formalising knowledge about complex hydrological systems. As a hydrological practitioner, I found the book more interesting than useful.

For example, I found out about next generation hydrological models based on representative elementary watershed (REW) concepts and the closure problem of estimating boundary fluxes (of mass, energy and momentum), which are nonlinearly related to storage. The author states that these new concepts do not outperform traditional rainfall-runoff models because the level of performance that is achievable is limited by the uncertainties in the observations against which they are being calibrated, i.e. there is a difficulty in making measurements of subsurface flows. The other reason given is that the types of closure scheme that are being used might still be improved due to lack of knowledge in describing processes, i.e. epistemic uncertainty.

Discussion about the theoretical development of the models and associated equations are largely restricted in appendices at the end of each chapter. A nice feature of the book is that summaries of

the key points from each chapter are presented and the reader is encouraged to read the summary prior to reading the chapter. From my perspective, I would have found it helpful if the summaries had been included at the start of the chapter and for the chapters to have been written in a larger text font.

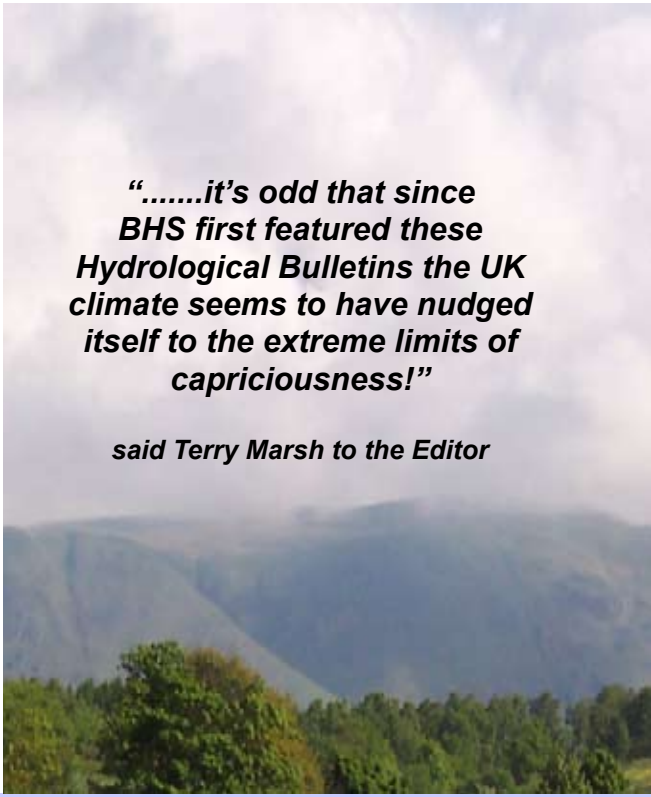
The practical problem of the poor performance of extrapolated rainfall-runoff models is not discussed adequately. This is an important issue as operational rainfall-runoff models are often calibrated on low impact flood events and then expected to perform well in high impact flood events. Errors in catchment rainfall are a key source of uncertainty in rainfall-runoff model results; this subject was not developed in sufficient depth in my opinion and is of practical interest. Should radar rainfall be used instead of raingauge derived rainfall? Should a merged radar/raingauge rainfall dataset be used? There was not enough discussion on the importance of error correction in managing uncertainty in operational rainfall-runoff model results in my opinion – should the error correction model be pre-configured on historic flood events or allowed to be optimised on the rising limb of the hydrograph where there is very little information content?

Beven has a bold vision of the development of detailed distributed rainfall-runoff models, so-called 'models of everywhere'; he argues that it will change the nature of the modelling process, from one in which general model structures are used in particular catchment applications to one in which modelling becomes a learning process about places. In particular, if a model is wrong about its prediction about a place, then this will be an important driver to do better.

In practice, there is a balancing act between prioritising the development of rainfall-runoff models based on a performance led approach or a risk based approach which takes account of the numbers of properties at risk of flooding, for example. If the 'models of everywhere' concept is assumed to be the same as a 'preliminary' model, then it can be used to guide future field data collection in order to better constrain model uncertainty in the future. The cost of different observation strategies can also be assessed, and the cost-benefit evaluated prior to actually making the measurements. Too often, rainfall-runoff modelling project briefs are to quickly develop a model with the available hydrometric data only to find that the required data, (e.g. artificial influences, spot flow gaugings, etc), are not available to adequately constrain the model uncertainty.

It is interesting to note that at the end of the book, the author states that "the limitations of observation techniques for subsurface flow pathways and processes, in particular, are likely to constrain how well we can predict rainfall-runoff processes." This is worth reflecting on as practitioners like myself would have assumed that other sources of error such as the flood stage-discharge rating or catchment rainfall are more important.

Oliver Pollard
Advisor (Flood Forecasting)
Environment Agency, South West Region



Publications news

New titles from IAHS

Revisiting Experimental Catchment Studies in Forest Hydrology

Edited by Ashley A. Webb, Mike Bonell, Leon Bren, Patrick N. J. Lane, Don McGuire, Daniel G. Neary, Jami Nettles, David F. Scott, John D. Stednick & Yanhui Wang
Collects 22 contributions generated from a workshop that gathered forest hydrologists from around the world, with the aim of revisiting experimental catchment results and promoting a renewal of international collaboration on revisiting experimental catchment studies in forest hydrology. IAHS Publ. 353 (2012) ISBN 978-1-907161-31-5, 240 + viii pp. Price £56.00

Isotope Hydrology

Selection, Introduction and Commentary by P. K. Aggarwal, K. O. Fröhlich, J. R. Gat & R. Gonfiantini
The book is the eighth in the IAHS Benchmark Papers in Hydrology series. Isotope hydrology includes papers on: A. Fundamentals, B. Atmospheric Water Cycle, C. Palaeoclimates, D. River and Lake Hydrology, and E. Groundwater. The editors provide the context in his commentaries. IAHS BM8 ISBN 978-1-907161-29-2 (2012) A4 format, hardback, Price £70.00

Changes in Flood Risk in Europe

Edited by Zbigniew W. Kundzewicz
Floods are the most prevalent natural hazard in Europe. This interdisciplinary book, authored by an international team, addresses the following questions: has flood risk increased in the continent? How, where, and why? Are climate change impacts apparent? How do socio-economic trends and associated land-use change impact flood risk?
IAHS Special Publication 10 (April 2012) ISBN ISBN 978-1-907161-28-5 (Paperback); 516 + xvi pp, Price £85.00

SPECIAL OFFER

If your order exceeds £40 (after discounts have been applied) you will receive a FREE COPY of:

HYDROLOGY: A question of balance
by J. V. Sutcliffe
IAHS Special Publication 7, ISBN 978-1-901502-77-0,

Order online or send orders and enquiries to:
Jill Gash jilly@iahs.demon.co.uk

ICE Bookshop is having a summer Sale

- up to 70% off hundreds of books across the Bookshop, until 31 Aug.

Buy on line if you are an ICE Member or visit the shop in Great George Street.

BHS 2012 Proceedings

The full papers are to be published in the BHS conference proceedings series as British Hydrological Society's Eleventh National symposium 'Hydrology for a changing World' ISBN: 1 903741 18 1. Because we are in the throes of uploading a new version of the BHS web site, please be patient at the delay in getting the papers on line. This fact is also affecting the listing of papers on the CrossRef site for DOI allocation.
My apologies for this delay: I will be in touch with authors as soon as possible with full citation details.

Celia Kirby

PHOTOGRAPHY COMPETITION 2012

As members will be aware, we are currently revamping the BHS website. Alongside this we are running a photography competition to help gather images for our new dynamic site. The competition is open to all members, who may submit up to two photographs on the topic of Hydrology in the UK. In submitting photographs to the competition you are agreeing for them to be included on our website and other publicity media; the winning entries will also be printed in *Circulation*. Entries should be emailed to tim.fuller@ice.org.uk by 31st August. The winner will be announced at the AGM in September.

First Prize: £200
Second Prize: £100
Third Prize: £50

The Rules:

1. Photographs must be original work.
2. Entrants must be the sole owner of copyright in all photographs entered and must have obtained permission of any person featured as necessary. Entrants must not have breached any laws when taking their photographs.
3. Entrants can submit up to two photos electronically in colour or black and white and no entrant can win more than one prize.
4. Each entry should be marked with the photographer's name, address, email address and telephone number.
5. Entrants should include the time and date the photo was taken plus a short description of the photograph in no more than 50 words.
6. Entrants will retain copyright in the photographs that they submit to the BHS. By entering the competition all entrants grant to the BHS the right to publish and exhibit their photographs on the BHS website and in print in the BHS newsletter or any other media. No fees will be payable for any of the above uses.
7. The BHS reserves the right to cancel this competition or alter any of the rules at any stage, if deemed necessary in its opinion, and if circumstances arise outside of its control.
8. Deadline for submission is 31st August 2012.



Hydrology Research:
an International Journal

BHS2010 Special Issue

An online preview of the October issue of HR (43/5), Guest Edited by Claire Walsh, Hayley Fowler, Chris Kilsby and Andrew Black, comprises the following extended versions of some of the papers presented at the international BHS2010 Symposium held in Newcastle *Role of Hydrology in Managing Consequences of a Changing Global Environment*. Subscribers to the journal can download these published HR papers now from http://www.iwaponline.com/nh/043/5/default.htm (or contact the authors directly). In October subscribers will be able to download the BHS2010 SI papers from the HR website in the usual way under 'Current Issue'.

Guest Editorial: Role of hydrology in managing consequences of a changing global environment
Walsh, C., Fowler, H., Kilsby, C. and Black, A.

Modelling and reconstruction of the River Kennet palaeohydrology and hydrogeology: Silbury Hill and Avebury in 4,400 BP
Whitehead, P.G. and Edmunds,W.M.

The role of groundwater characteristics in catchment recovery from nitrate pollution
Dunn, S.M., Darling, W.G., Birkel, C. and Bacon, J.R.

Reconciling observed and modelled phytoplankton dynamics in a major lowland UK river, the Thames
Lázár, A.N., Wade, A.J., Whitehead, P.G., Neal, C. and Loewenthal, M.

Crisp discharge forecasts and grey uncertainty bands using data-driven models
Alvisi, S., Creaco, E. and Franchini, M.

Self-organising map rainfall-runoff multivariate modeling for runoff reconstruction in inadequately gauged basins
Adeloye, A.J. and Rustum, R.

An appraisal of the performance of data-infilling methods for application to daily mean river flow records in the UK
Harvey, C.L., Dixon, H. and Hannaford, J.

Prediction intervals for rainfall–runoff models: raw error method and split-sample validation
Ewen, J. and O'Donnell, G.

Frequency analysis of extreme rainfall in Cumbria, 16–20 November 2009
Stewart, E.J., Morris, D.G., Jones, D.A. and Gibson, H.S.

Setting design inflows to hydrodynamic flood models using a dependence model
Faulkner, D., Keef, C. and Martin, J.

Building local/lay flood knowledges into community flood resilience planning after the July 2007 floods, Gloucestershire, UK
McEwen, L. and Jones, O.

Multi-year droughts in Europe: analysis of development and causes
Parry, S., Hannaford, J., Lloyd-Hughes, B. and Prudhomme, C.

Evidence for the onset and persistence with depth of preferential flow in unsaturated fractured porous media
Ireson, A.M., Butler, A.B. and Wheater, H S.

Simulation of snow and soil water content as a basis for satellite retrievals
Sandells, M. J., Flerchinger, G. N., Gurney, R. J. and Marks, D.

A preliminary appraisal of Thurnham dual polarisation radar in the context of hydrological modelling structure
Zhu, D. and Cluckie, I.D.

BHS2012 Special Issue

A Special Issue of HR arising from the BHS2012 Symposium held at Dundee in July is being Guest Edited by Andrew Black. By agreement with the publishers, online publication should be about July 2013. This will require Authors and Reviewers to keep to a tight timetable Andrew has drawn up. So, Authors and Reviewers please help by complying with the aspects of Andrew's timetable that concern you. With your help, online publication of the BHS2012 Special Issue should be about one year after the event (much faster than the BHS2010 SI).

Other national hydrological societies adopting HR

With agreement from BHS and NHF the Italian Hydrological Society (IHS) and the recently-formed German Hydrological Society (DHG) have adopted HR as their official journal. This is warmly welcomed by the HR Editors and IWA Publishing, and we look forward to any further similar developments. Perhaps this might help with active links between BHS, NHF, IHS and DHG?

To close, I'd like to reiterate a couple of points concerning submissions of manuscripts to HR from UK-based hydrologists. First, Special Issues arising from BHS Symposia are great but manuscripts from UK-based hydrologists for standard issues of the journal are welcome too – please consider supporting HR, the official journal of BHS, in this way. The second point: Submission of research manuscripts from UK-based hydrologists not based at universities or research institutes are also welcome.

Ian Littlewood
Editor (BHS) Hydrology Research: an International Journal

daylighting.org.uk

– a resource of case studies on devulverting urban rivers from aroundthe world

This new website provides case study details of deculverting/ daylighting urban rivers from around the world. It has been set up following CIWEM's policy position statement on deculverting and aims to spread awareness of this river restoration technique to practitioners and policy makers. Researchers will also find it useful as it documents the projects' goals and outcomes and links to more material. Everyone can easily add a new case study site, or submit corrections/improvements to the database.

MSc Studentship competition

A reminder that the deadline for this is 20 August — see web site for terms and conditions plus link for on-line applications.

'Lost'members – where are they now?

A plea from our ICE Secretary, Tim Fuller, for help in locating the following, as recent postings and emails to the addresses on our master datebase have failed.

Name	*Last location*	*Date joined*
Dr Matthew Brian Charlton	Nottingham	(2001)
Mr Andrew Bruce Frost	Letchworth–Willmott Dixon Ltd	(2000)
Mr Jonathan Paul Hunter	Hove West Sussex	(1998)
Miss Kim Mack	Exeter University	(2010)

If you have any information, Tim would like to hear (contact details given in the box on the back cover).

Call for papers:

River Basin Management 2013
22 – 24 May, 2013
New Forest, UK
– all aspects of Hydrology, Ecology, Environmental Management, Flood Plains and Wetlands.
http://www.wessex.ac.uk/rbm2013rem2a.html

Circulation is published quarterly. It is free to members of the British Hydrological Society and costs £25 to nonmembers on annual subscription.

■ Membership enquiries: Tim Fuller, BHS Secretary, Institution of Civil Engineers, 1-7 Great George Street, London SW1P 3AA. Tel: 0207 665 2234 Email: bhs@ice.org.uk

■ Editor: Celia Kirby Tel: 01544 230053 Email celia.kirby@btinternet.com

■ Web pages: **http://www.hydrology.org.uk/**

Circulation is indexed in *Geosystems' Hydrotitles* & *GeoArchive* and *NISC HydroROM.*

LuWQ2013
International Interdisciplinary Conference on Land Use and Water Quality:
Reducing Effects of Agriculture
The Hague, the Netherlands, 10–13 June 2013
Abstracts due by 20 October 2012
http://www.luwq2013.nl/

BHS 30th Annual General Meeting

The 30th Annual General Meeting of the British Hydrological Society will be held at Centre for Life, Newcastle upon Tyne, on 26th September 2012 (during the National Meeting, 'Hydrological challenges and emerging solutions in urban areas')

AGENDA

A. President's Introductin
B. President's Report
C. Student Prize Award
D. To note the report of the 29th AGM held on 20th September 2011 (see *Circulation* No. 111, pages 20–21)
E. Honorary secretary's Report
F. Changes to the membership of Main Committee
G. Honorary Treasurer's Report
H. Any Other Busines (any substantial issues from a BHS member should be notified to the Honorary Secretary, Claire Walsh, in advance of the meeting.)

Claire Walsh, Hon. Secretary
School of Civil Engineering and Geosciences, Newcastle University, NE1 7RU
Tel 0191 222 6618; email claire.walsh@ncl.ac.uk

Diary

12th Sept 2012
Natural Flood Management
Scottish Hydrological Group Regional Meeting
Time: 18.30
Location: Glasgow University (Wolfson Medical Building)
Contact: Caroline Anderton (Tel: 0131 319 2940)

26th Sept 2012
Hydrological challenges and emerging solutions in urban areas
BHS National Meeting
Time: 10.00
Location: Centre for Life, Newcastle upon Tyne
Contact: Claire Walsh (Tel: 0191 222 6618)

26th Sept 2012
BHS Annual General Meeting
Agenda - see page xx
Time: 14.00
Location: Centre for Life, Newcastle upon Tyne
Contact: Claire Walsh (Tel: 0191 222 6618)

Copy deadline for* Circulation *No. 115
24th October 2012